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ABSTRACT

A study was conducted to examine the relationship between the components of the Type A behavior pattern and the maintenance of exercise participation in a 5-month physical fitness program. Metropolitan Government employees (N=200) volunteered to participate in a pilot health promotion program. Physical fitness activities (supervised walking, jogging, aerobic dancing) were open to all participants and were conducted on shared work and personal time. Other wellness activities were reserved for those most at risk. Type A behavior, intention to exercise regularly, expected support, cardiovascular fitness, body composition, and percentage of body fat were measured. The results revealed that control variables (smoking, body fat, blue-collar occupation, fitness ratings, intentions to exercise, support for exercising) contributed to a smaller part of the predicted variance than did Type A variables. Monitoring the exercise activity was the single strongest adherence predictor. Scoring high on both anger expression and hostility was the strongest Type A behavior pattern predictor. After controlling for compliance mediated effects, the interaction of high scores in time pressure, hostility, and anger still tended to predict low cardiovascular benefits. These findings suggest the importance of psychosocial variables in exercise maintenance. (NB)

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TYPE A BEHAVIORS, HOSTILITY, ANGER AND EXERCISE ADHERENCE

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PURPOSE

The major purpose of this study was to understand the relationship between the components of the Type A behavior Pattern (time-pressure, hostility, anger) and the maintenance of exercise participation in a five-month physical fitness program offered to Metropolitan Government employees. In addition, a new instrument was used to explore how the implementation of a Type A attitude toward exercise may affect adherence. Factors usually associated with exercise adherence (i.e., smoking, body fat, blue-collar occupation) were taken into account and included in the analyses as control variables.

METHOD

Subjects

A stratified random sample of 332 Metropolitan Government employees had been selected among 800 (10% of the population) volunteers for "Lifeworks", a pilot health promotion program designed and implemented by the Vanderbilt Health Promotion Center. Of the 332, 200 (70%) agreed to participate in this study. Study participants were representative of the overall Lifeworks sample in age, sex, race, white-collar (49.5%) and secretarial occupations (16.8%) but the blue-collar (11.4% Vs. 15.9%) and protection categories (12% Vs 16%) were underrepresented.

Procedure

Physical fitness activities (supervised walking, jogging, aerobic dancing) were open to all Lifeworks participants and conducted on shared Metro and personal time. Other wellness activities were reserved to those most at risk.

Type A testing took less than one hour and was conducted during the first weeks of the program after health and fitness feedback had been given to the participants. Compliance interviews directly followed post-fitness testing and emphasized the association between fitness benefits and regular exercise in order to promote accurate feedback.

Measures

TABP and Running Attitude measures are presented in Table 1. The Buckalew Type A Running Test (Buckalew 1985) was developed with runners and adapted for this study mostly by substituting exercise or training for "running" and competition for "racing". Three subscales were computed on the basis of conceptual relevance and factor analysis data.

Intention to exercise regularly and expected support were measured using Likert-type scales. Cardiovascular fitness was determined by the Astrand Rhyming bicycle test for lower-risk participants and the Bruce maximal treadmill test for the higher risks. Seven site skinfold measurement was used to evaluate body composition and precentage of body fat using Pollock and Siri formulae.

Dependent measures of exercise compliance included: (a) exercise adherence ratings by three health promotion and exercise experts based on self-reported exercise intensity, frequency and duration for each of the 5 months; (b) subjects' ratings of how much they "worked" on exercise and (c) prepost changes in max V02 estimates of cardiovascular fitness.

TABLE 1

TYPE A VARIABLES

Instruments	TABP Components	# of items	Alpha Reliability
BRS	Time-pressure	14	.42
(Bortner scale)	Impatience	(10)	.62
MMPI	Cynicism hostility	24	.87
Subscales	Paranoid hostility	15	
Anger Expression	Total Anger	20	.70
(Spielberger AX	Anger In (Repressed)	(8)	.72
scale)	Anger Out (expressed)	(8)	.79
	RATT Scales		
Type A running	Type A attitude		
Attitude Test	toward exercise	16	.82
(Buckalew, 1985)	Exercise Monitoring	(4)	.77
	Exercise Competition	(2)	.90
	Exercise Anger	(3)	.57

a. The shorter, more reliable 10-item scale was used.
b. From Costa, Zonderman, Mc Crae and Williams (1985): factor analysis study with cardiac patients.

RESULTS

1. The full models predicted a fair amount of the variance in all three dependent measures of exercise (see Figure 1).

2. Control variables (smoking, body fat, blue-collar occupation, fitness ratings, intention to exercise, support for exercising) contributed to a smaller part of the predicted variance (1/8 to 1/3) than Type A variables.

3. Monitoring the exercise activity was the single strongest adherence predictor as it predicted 13 to 18% of the variance (see Table 2).

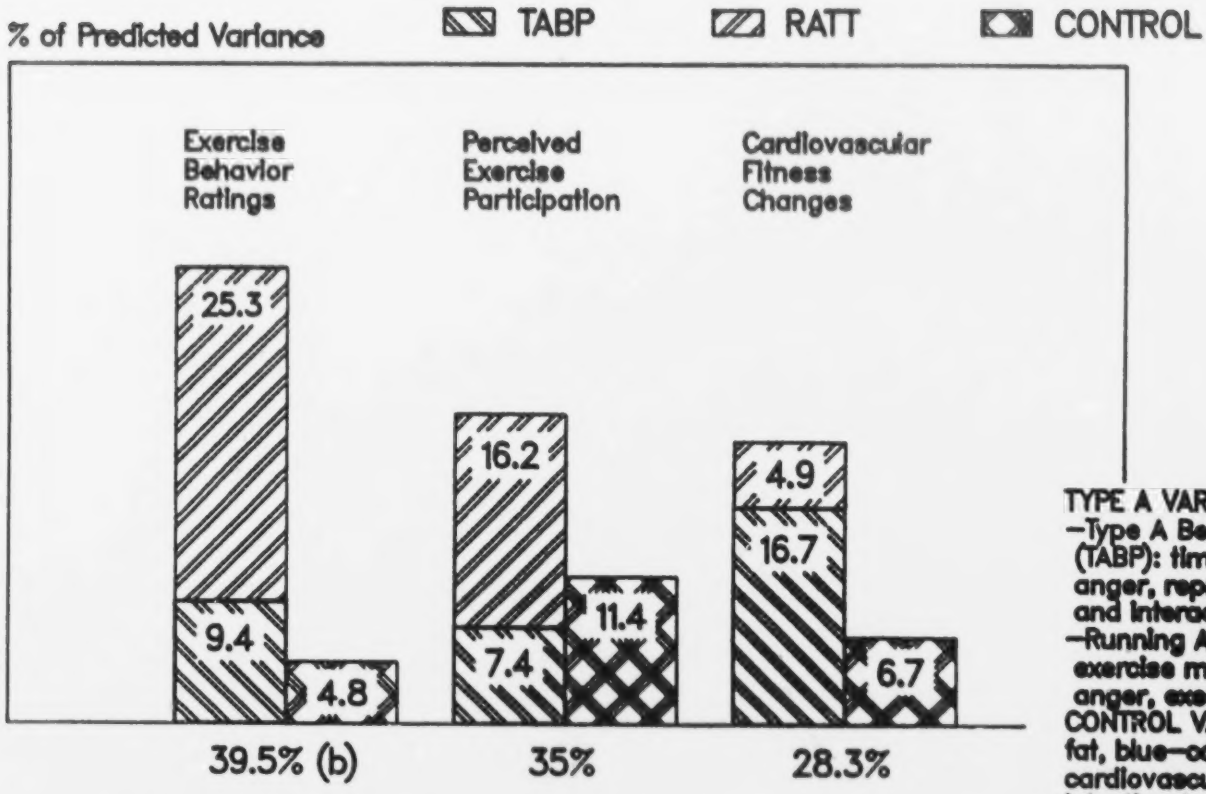
4. Scoring high (above the mean) on both anger expression and hostility was the strongest TABP predictor. The anger by hostility interaction was predictive of low exercise adherence with the three independent variables.

5. Keeping anger inside (anger in) predicted low exercise ratings but not the perception of exercise efforts or cardiovascular fitness changes.

6. The other Type A components were weak predictors when taken independently. Hostility and time pressure (TAB) made a contribution as supressor variables as indicated by significant positive beta weights and low negative simple correlations. Those were relatively high for expressed anger suggesting that multicollinearity contributed to lack of independent prediction.

7. After controlling for compliance mediated effects, the interaction of high scores in time pressure, hostility, and anger still tended to predict low cardiovascular benefits ($p = .0051$).

Figure 1
Variance Predicted by Type A and Control Variables
for the three Dependent Measures.(a)



TYPE A VARIABLES
–Type A Behavior Pattern components (TABP): time pressure, expressed anger, repressed anger, hostility and interaction terms.
–Running Attitude subscales (RATT): exercise monitoring, exercise anger, exercise competition.
CONTROL VARIABLES: smoking, body fat, blue–collar occupation, cardiovascular fitness ratings, intention to exercise, support for exercising.

a. Based on squared semi–partial correlations in regression analyses.
b. Total Predicted Variance for each model.

TABLE 2

SIGNIFICANCE OF BETA WEIGHTS CONTRIBUTION TO REGRESSION ANALYSES FOR THE THREE DEPENDENT VARIABLES

	Exercise Behavior Ratings	Perceived Exercise Partic.	Cardiovascular Fitness Changes
Low adherence predictors:			
Hostility x Anger Out(H)[a]	<.005	<.05	<.001
TAB x Host. x Anger Out(H)	<.10	<.05	<.01
Anger In (repressed anger)	<.005		
Exercise Competition	<.01	<.05	
Exercise Anger	<.05		
Fitness Ratings	<.10[b]		
Smoking	<.10		
High adherence predictors:			
Exercise Monitoring	<.001	<.001	<.10
Hostility		<.05	<.05
Time-pressure (TAB)			<.10
Hostility x Anger Out (L)[c]			<.005
Intention to exercise		<.001	
Exercise Support		<.001	

a. Interaction of high scores (above the mean).
b. Negative Contribution
c. Interaction of low scores

DISCUSSION

1. The weakness of the smoking, body fat, and blue-collar predictors is in contradiction with current findings (Dishman, 1982, Martin and Dubbert, 1984). In this study, smokers tended to receive lower exercise ratings (p = .076) and to be less likely to come back for post fitness testing (as indicated by discriminant analyses comparing those who did not show up for retesting to the other compliance groups). Body fat had little discriminative power as a variable since 70% of the sample was overweight. As for blue-collar workers, they were underrepresented in our study. Our results must therefore be interpreted with caution. It may also be, as suggested by Dishman's stage theory of exercise compliance, that those variables are better predictors of initial involvment than of the exercise maintenance stage.

2. The most significant contributions of control variables were the contribution of "intention to exercise" and of "expected support" to perceived exercise efforts. Since those variables did not predict exercise behavior or exercise outcomes (fitness changes) their contribution to exercise adherence remains questionable.

3. The strength of the "hostility by anger" interaction as an exercise adherence predictor is one of the most interesting findings. Individuals with high levels of hostility and lack of trust in others who also tend to experience anger frequently are likely to be low exercise compliers. The relationship remains true but is weakened if they are also time-pressured. Those results may help understand some of the inconsistencies found in previous studies (see Dishman, 1985, Martin and Dubbert 1984). While the most consistently reported association was between the TABP and dropout behavior, some studies showed higher adherence for JAS assessed Type As. The hostility and anger components are underrepresented in JAS assessment and may have been critical in determining the direction of the TABP-compliance association.

4. Keeping anger inside (anger in) predicted low exercise participation ratings. Potential for hostility (overt anger expression and hostile attitude) and anger in are currently viewed as the TABP components most predictive of coronary heart disease (see Dembrovaki et al., 1985, Mac Dougall et al., 1985, Spielberger et al, 1985). Their association with exercise non-adherence, and potentially with other preventive behaviors as well, suggests a possible link between the TABP and CHD through selective noncompliance of high risk Type As and argues for a conceptual and empirical distinction between hostile attitude, angry feelings and modes of anger expression.

5. The running attitude subscales are potentially valuable exercise compliance predictors. Exercise monitoring (perception of control, planning, clear and strong exercise goals) was the strongest predictor of exercise maintenance. Lack of those perceptions predicted low adherence, in line with current conceptualizations of the TABP as a coping style developed as a response to perceptions of uncontrollability and ambiguity. The anger experienced during exercise (exercise anger) was a better predictor of low adherence than the general tendency to express anger outward.

6. The study findings stress the importance of psychosocial variables in exercise maintenance. They suggest that there is potential and need for compliance interventions such as early screening of high-risk non compliers and the design of exercise programs taking their characteristics into account and emphasizing goal setting and sense of control over the exercise activities. Exercise compliance interventions may also contribute to TABP prevention as regular aerobic exercise has been associated with reduction in the TABP itself (Blumenthal et al. 1980, Janovski, 1983).

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